

REMARKS

Claims 1-19, 21 and 23 are pending in the application.

Claims 1-19 and 21 are rejected.

Claim 23 is objected to.

Claims 1-19 and 21 are rejected under 35 U.S.C. 103(a).

No new matter is added.

Claims 1-19, 21 and 23 remain in the case for consideration.

Applicants request reconsideration and allowance of the claims in light of the above amendments and following remarks.

Claim Rejections - 35 U.S.C. § 103

Claims 1-7 and 21 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over U.S. Patent No. 6,133,637 issued to Hikita, et al. (hereinafter "Hikita") in view of Japanese Patent No. 63-240053 A issued to Kondo, et al. (hereinafter "Kondo") and U.S. Patent No. 6,099,783 issued to Scranton, et al. (hereinafter "Scranton"). Applicants respectfully traverse this rejection.

Rejecting claim 1, the Office Action asserts that Hikita shows in FIG. 9 "a soft element (...18) ... being more elastic and flexible than the mold resin [(22)] (col. 5, lines 24-38)." Applicants respectfully disagree.

Specifically, Hikita fails to teach or even suggest that column 5, lines 24-38 of teaches wherein the adhesive 18 is "more elastic and flexible" than the package 22. Moreover, while Hikita indicates that the adhesive 18 can be formed of epoxy resin or elastomer (see Hikita, column 5, lines 24-25), Hikita also discloses that the package 22 can be also be formed of an epoxy resin (see Hikita, column 6, lines 32-33). Hikita, however, fails to teach or even suggest that the adhesive 18 is "more elastic and flexible" than the package 22 of Hikita. Moreover, the Office Action fails to identify any evidentiary support indicating that the adhesive 18 is "more elastic and flexible" than the package 22 of Hikita. Additionally, neither Kondo nor Scranton provide any teaching or suggestion that the adhesive 18 of Hikita is "more elastic and flexible" than the package 22. In the absence of any teaching or suggestion that the adhesive 18 of Hikita is "more elastic and flexible" than the package 22, Applicants respectfully submit that Hikita has been modified to arrive at the elements recited in claim 1 only with the benefit of improper

hindsight reasoning. For at least these reasons, Applicants respectfully submit that the proposed combination of Hikita in view of Kondo and Scranton fails teach every element as recited in claim 1. See M.P.E.P. 2143.03. Accordingly, Applicants believe claim 1 to be in condition for allowance.

Claims 2-7 and 21 depend from claim 1 and, therefore, include all elements recited in claim 1. Accordingly, Applicants believe claims 2-7 and 21 to be in condition for allowance by virtue of this dependency.

Further, in rejecting claims 2 and 3, the Office Action asserts that Hikita shows in FIG. 9 that “a soft element (... 26) contacts an entire surface of the side or a portion of the side of the semiconductor chips.” Notwithstanding this interpretation of Hikita, claims 2 and 3 depend from claim 1 and, therefore, include the element “the soft element including an elastomer or an epoxy resin without a filler” as recited in claim 1. At column 6, lines 25-27, Hikita discloses that the “inner package 26 is formed of ... epoxy resin with a filler to increase its moisture resistance.” In view of the actual disclosure cited above, Applicants respectfully submit that Hikita fails to teach every element as recited in claims 2 and 3. Neither Kondo nor Scranton cure this deficiency of Hikita. For at least this additional reason, Applicants believes claims 2 and 3 to be in condition for allowance.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Hikita in view of Kondo and Scranton, and further in view of Derderian (US 6,569,709). Applicants respectfully traverse this rejection.

Claims 8 and 9 depend from claim 1 and, therefore, include all elements recited in claim 1. Accordingly, Applicants believe claims 8 and 9 to be in condition for allowance by virtue of this dependency.

Further, in rejecting claim 8, the Office Action relies upon Derderian as disclosing a package “having solder balls (14) formed as terminals for connecting the package to an external circuit” and asserts it would have been obvious to “modify the package of Hikita, Kondo, and Scranton ... as taught by Derderian to connect the package to an external circuit.” Applicants respectfully disagree.

For example, FIG. 9 of Hikita shows a semiconductor device 10 having lead terminals 12b. At column 15, lines 24-31, Hikita discloses:

The lead terminals 12b are for mounting the resin-packaged semiconductor device 10 on a desired position. Specifically, the resin-packaged semiconductor device 10 is placed on an area applied with a solder cream in a manner contacted by the lead terminals 12b, and then the solder cream is heated to cause solder reflow. Thus, the resin-packaged semiconductor device 10 can be surface-mounted on that area.

Applicants respectfully submit it would not have been obvious to use the solder balls allegedly taught by Derderian to connect the semiconductor device 10 to an external circuit because Hikita already teaches a means doing so via lead terminals 12b. Moreover, the Office Action identifies no suggestion to replace the lead terminals 12b of Hikita with the solder balls 14 of Derderian. For at least this additional reason, Applicants respectfully submit that the cited references fail to suggest the desirability of their combination as proposed. See M.P.E.P. § 2143.01(I). Accordingly, Applicants believe claim 8 to be in condition for allowance.

Claims 10-13 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over U.S. Patent No. 6,215,182 issued to Ozawa, et al. (hereinafter "Ozawa") in view of Kondo and Scranton. Applicants respectfully traverse this rejection.

In rejecting claim 10, the Office Action asserts that "[w]hen combined with Ozawa, the soft element [(i.e., the flexible material 9 of Kondo)] would not be formed between the at least two semiconductor chips since Ozawa relies upon a film adhesive (38) to secure the chips to each other." Nevertheless, Applicants submit that claim 10 recites "a soft element ... not on surfaces between the at least two semiconductor chips" rather than a soft element "not formed between the at least two semiconductor chips," as asserted in the Office Action.

The semiconductor elements 22-24 shown in FIG. 5 of Ozawa are arranged together such that "at least one peripheral side of each of the semiconductor elements 22, 23 and 24 is stepped so that they are stacked like stairs" (see Ozawa, column 5, lines 4-8). Thus, an upper surface of semiconductor element 24, for example, is between semiconductor elements 24 and 23. Likewise, an upper surface of semiconductor element 23 is between semiconductor element 23 and 22. As acknowledged in the Office Action, FIG. 2 of Kondo shows wherein the flexible material 9 is "formed on an entire upper surface and side surface of a chip 1." Accordingly, if Ozawa were modified pursuant to the teachings of Kondo, the flexible material 9 of Kondo would necessarily be formed on above-described upper surfaces of semiconductor elements 24

and 23 shown in Ozawa. Thus, the flexible material of Kondo would necessarily be formed on surfaces between the semiconductor elements of Ozawa and a structure that is expressly contrary to that which is recited in claim 10 would be formed. For at least these reasons, Applicants respectfully submit that the proposed combination of Ozawa in view of Kondo and Scranton fails teach every element as recited in claim 10. See M.P.E.P. 2143.03. Accordingly, Applicants believe claim 10 to be in condition for allowance.

Claims 11-13 depend from claim 10 and, therefore, include all elements recited in claim 10. Accordingly, Applicants believe claims 11-13 to be in condition for allowance by virtue of this dependency.

Claims 14-16 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Hikita in view of Scranton. Applicants respectfully traverse this rejection.

In rejecting claim 14, the Office Action asserts it would have been obvious to “modify the soft element of ... [Hikita] by using an encapsulant material having no filler as taught by Scranton to form a soft element having a putty-like property.” Applicants respectfully disagree.

For example, at column 6, lines 25-27, Hikita discloses that the inner package 26 “is formed of ... epoxy resin with a filler to increase its moisture resistance.” Even if the inner package 26 of Hikita could be modified to have a “putty-like property” as proposed, Applicants respectfully submit that such a modification would involve removing the filler expressly provided for by Hikita. As a result of the proposed modification, Applicants respectfully submit that the moisture resistance of the inner package 26 without filler would be decreased relative to the moisture resistance of the inner package 26 with filler. Thus, the susceptibility of chips 14 and 16 to moisture would necessarily be increased, rendering the semiconductor device 10 of Hikita unsatisfactory for its intended purpose. For at least these reasons, Applicants respectfully submit that there is no suggestion or motivation to make the proposed combination of Hikita in view of Scranton. See M.P.E.P. 2143.01(V). Accordingly, Applicants believe claim 14 to be in condition for allowance.

Claims 15 and 16 depend from claim 14 and, therefore, include all elements recited in claim 14. Accordingly, Applicants believe claims 15 and 16 to be in condition for allowance by virtue of this dependency.

Claims 17-19 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Hikita in view of Scranton, and further in view of Kondo. Applicants respectfully traverse this rejection.

Claims 17-19 depend from claim 14 and, therefore, include all elements recited in claim 14. Accordingly, Applicants believe claims 17-19 to be in condition for allowance by virtue of this dependency.

Allowable Subject Matter

Applicants appreciate the indication of allowable subject matter of claim 23.

Conclusion

For the foregoing reasons, reconsideration and allowance of claims 1-19, 21 and 23 of the application as amended is requested. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

Respectfully submitted,

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